



Synthesis and Characterization of $\text{Fe}_{0.8}\text{Mn}_{0.2}\text{Fe}_2\text{O}_4$ Ferrite Nanoparticle with High Saturation Magnetization via the Surfactant Assisted Co-Precipitation

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Table 1. Average crystalline sizes (D) calculated by using the Debye-Scherrer's Equation and Williamson-Hall Plot, and ϵ values from Williamson-Hall Plot of the synthesized $\text{Fe}_{(1-x)}\text{Mn}_x\text{Fe}_2\text{O}_4$ -1.2CMC-SDS ferrite nanoparticles.

Sample	D (nm)		ϵ value from Williamson-Hall Plot
	Debye-Scherrer's Equation	Williamson-Hall Plot	
MnFe_2O_4 -1.2CMC-SDS	7.80	11.9	3.24×10^{-3}
$\text{Fe}_{0.4}\text{Mn}_{0.6}\text{Fe}_2\text{O}_4$ -1.2CMC-SDS	7.82	12.8	4.01×10^{-3}
$\text{Fe}_{0.8}\text{Mn}_{0.2}\text{Fe}_2\text{O}_4$ -1.2CMC-SDS	10.8	13.5	1.17×10^{-3}
Fe_3O_4 -1.2CMC-SDS	13.3	14.0	7.21×10^{-5}

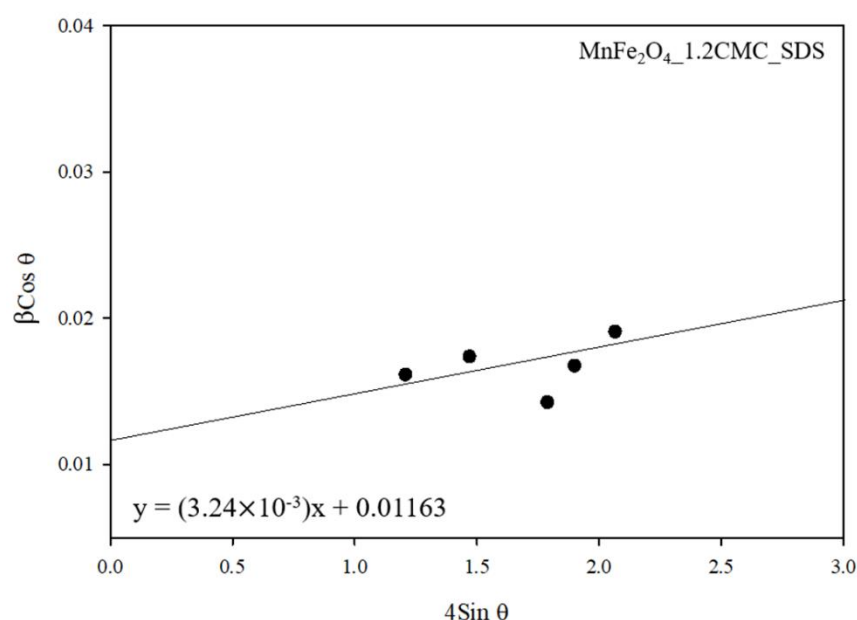


Figure S1. 1 Williamson-Hall plot of MnFe_2O_4 -1.2CMC-SDS ferrite nanoparticles.

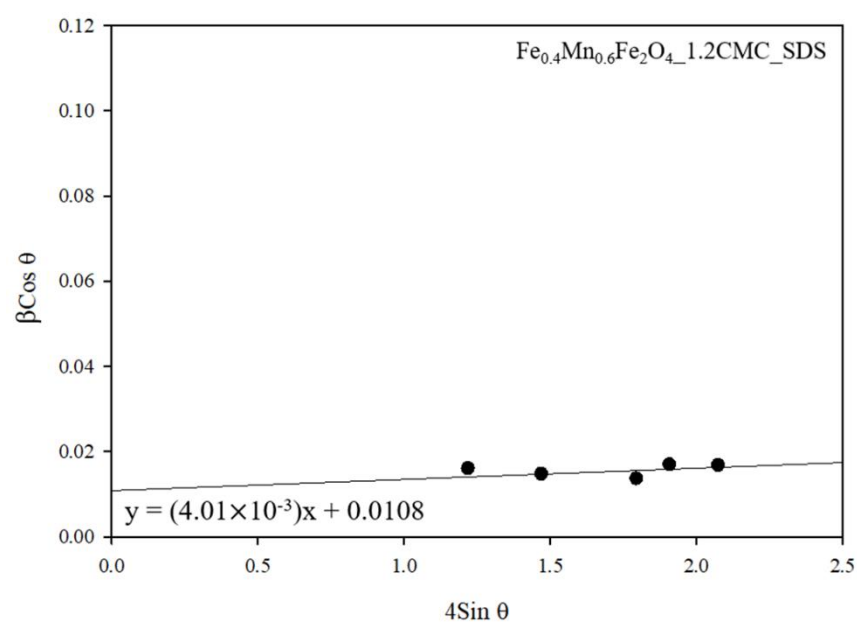


Figure S1. 2 Williamson-Hall plot of $\text{Fe}_{0.4}\text{Mn}_{0.6}\text{Fe}_2\text{O}_4_{1.2\text{CMC_SDS}}$ ferrite nanoparticles.

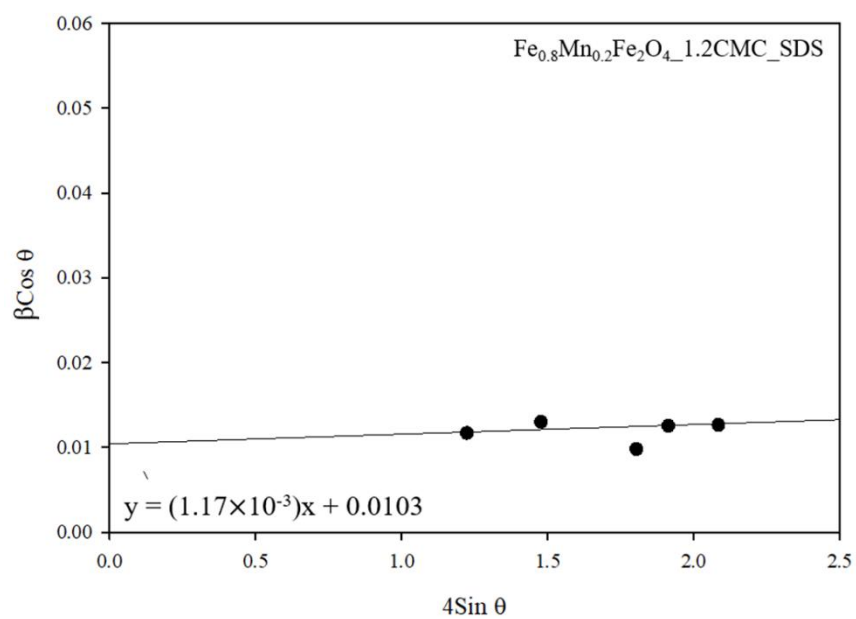
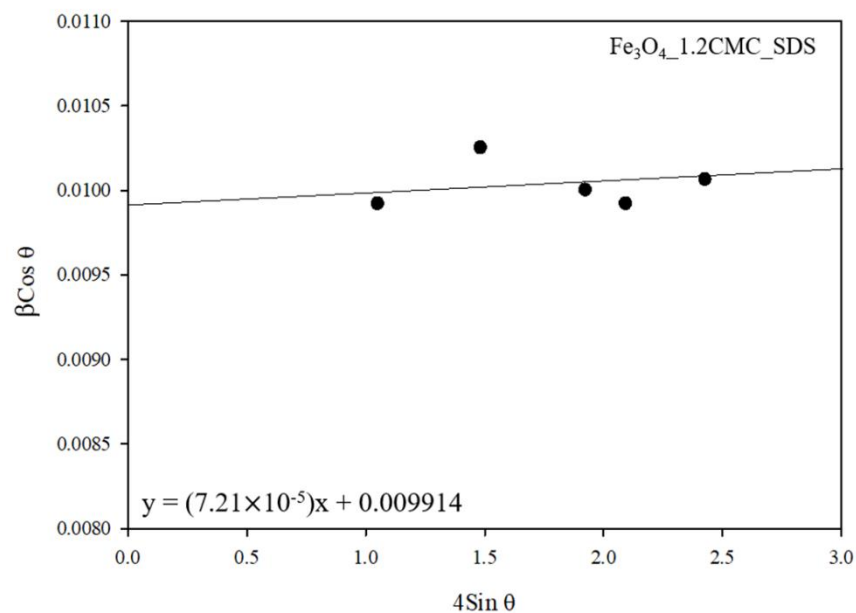
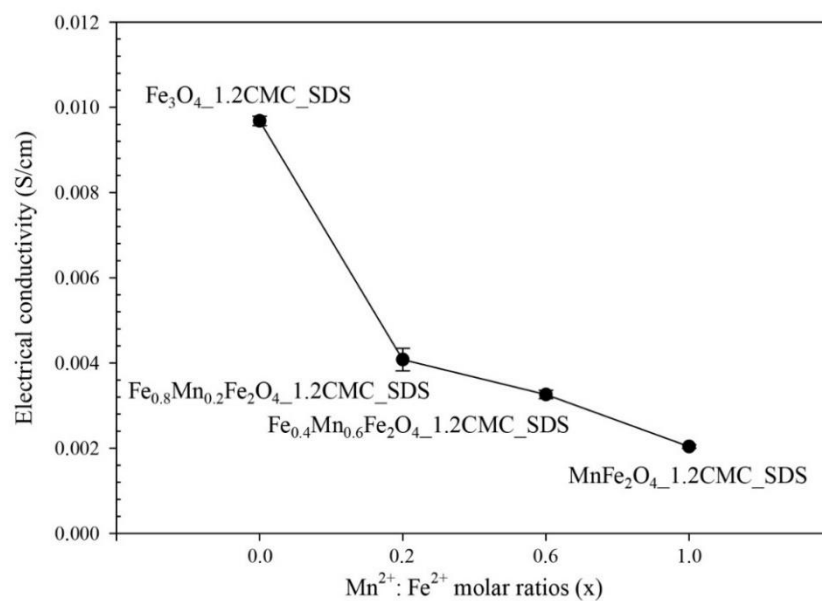


Figure 1. 3 Williamson-Hall plot of $\text{Fe}_{0.8}\text{Mn}_{0.2}\text{Fe}_2\text{O}_4_{1.2}\text{CMC_SDS}$ ferrite nanoparticles.**Figure 1. 4** Williamson-Hall plot of $\text{Fe}_3\text{O}_4_{1.2}\text{CMC_SDS}$ ferrite nanoparticles.**Figure S2.** Electrical conductivity of the synthesized bare MnFe_2O_4 and $\text{Fe}_{(1-x)}\text{Mn}_x\text{Fe}_2\text{O}_4_{1.2}\text{CMC_SDS}$ ferrite nanoparticles.

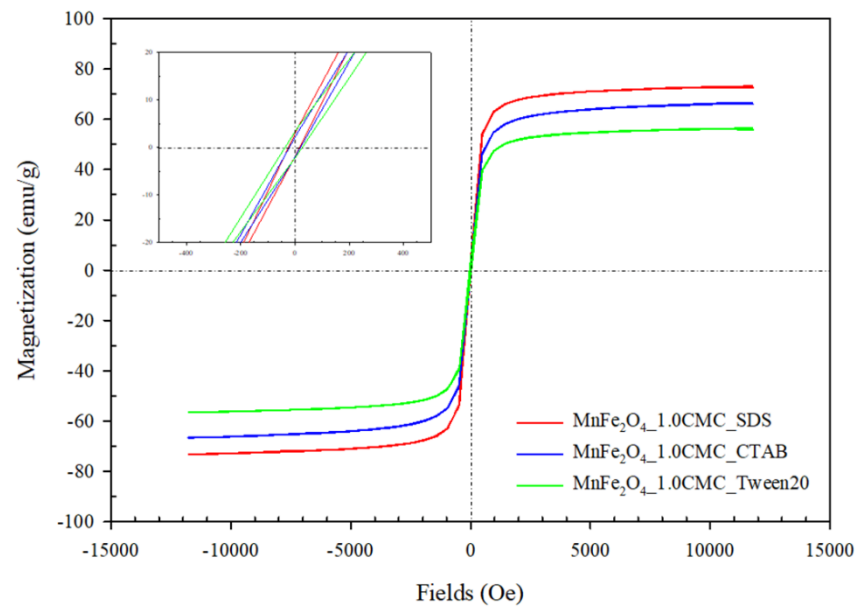


Figure S3. Magnetizations of the synthesized MnFe_2O_4 ferrite nanoparticles under various surfactant types.

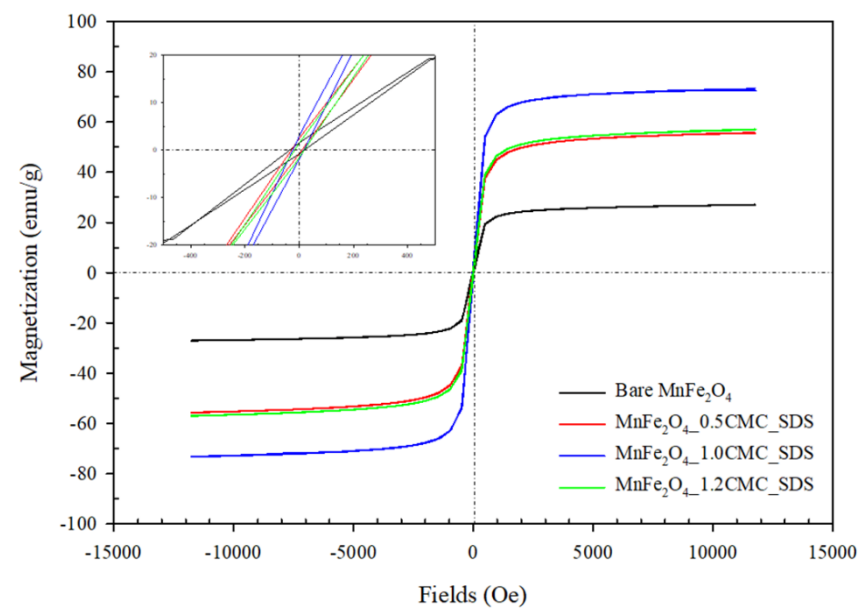


Figure 4. Magnetizations of the synthesized bare MnFe_2O_4 and MnFe_2O_4 ferrite nanoparticles under various SDS surfactant concentrations.